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(54) Abstract Title

Preservation of snack foods

(57) The shelf life of snack foods (such as potato crisps/chips, flour based snacks, extruded fried snacks, baked snacks and packaged French fries) is prolonged by storing the snacks in an argon-rich environment obtained by introducing an argon-rich gas into a substantially gas-impermeable container such as a metallised plastic film bag containing the food during packaging. The argon-rich atmosphere may be substantially 100% argon or may comprise other gases eg. carbon dioxide or nitrogen in addition. Use of an argon-rich environment prolongs the shelf life of snack foods and reduces the deterioration in taste quality.

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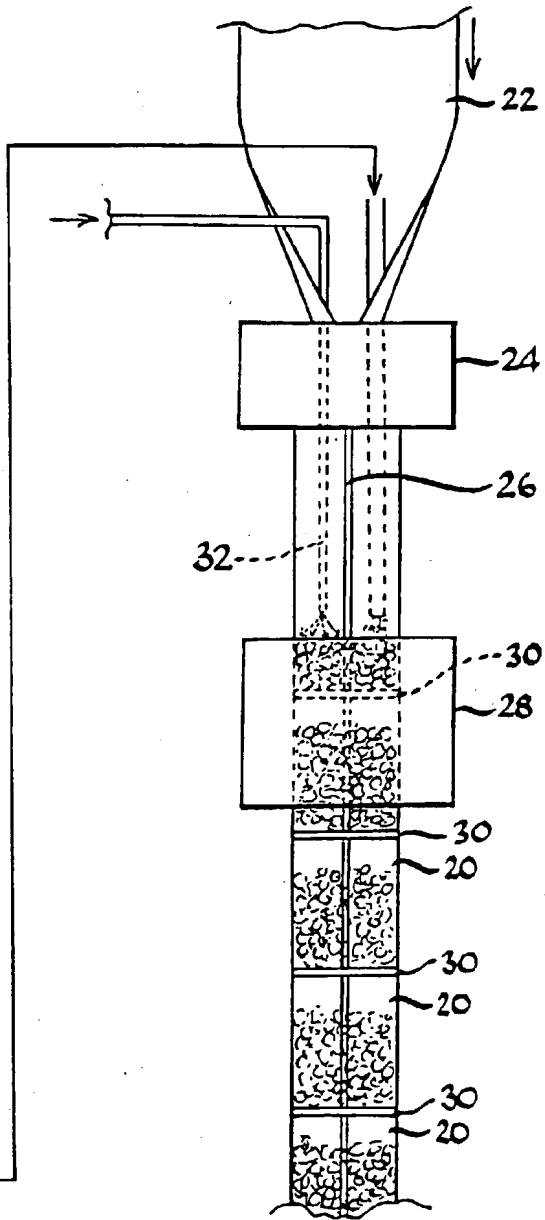
PEEL AND
SLICE
POTATOES S10

DEEP FRY
SLICED
POTATOES S12

COOLING S14

SEASONING S16

DISPENSE
CRISPS S18



DESCRIPTIONPRESERVATION OF SNACK FOODS

The present invention relates to the preservation of snack foods and in particular, but not exclusively, to processed and/or cooked snack foods such as, for example potato crisps (chips), flour based snacks (e.g. tortilla chips), extruded fried snacks, baked snacks and packaged french fries (pommes frites).

It is an object of the present invention to prolong the storage life of such products and additionally to prevent deterioration of the taste and texture of the products during storage.

In the preparation of snack foods, the raw ingredients are prepared (and mixed where appropriate), processed (normally by cooking, particularly by frying in oil), cooled and seasoned where appropriate. Portions of predetermined weight of the product are then packed into receptacles which are typically in the form of plastic bags conveyed along a filling line, which are then sealed.

Whilst such methods of packaging are effective in preventing the ingress of moisture into, or the egress of moisture from, the container after packaging, there is inevitably a volume of air which remains in contact with the product during storage. The presence of such air, and in particular the oxygen content, contributes to the deterioration of the quality and taste of the product

during storage.

In an attempt to increase the shelf life of such products it is known to displace the air in the container during packaging with a charge of nitrogen. In such methods the incoming nitrogen is injected at a relatively high velocity which causes the majority of the air (and therefore the majority of the oxygen) to be displaced from the package. If the package is sealed very shortly thereafter the product is thereafter stored in a nitrogen-rich and oxygen-depleted environment, thereby increasing the shelf life of the product.

However, whilst the use of nitrogen improves the shelf life of the product, the taste quality of the product still deteriorates more than is desirable during such an extended shelf life.

In accordance with a first aspect of the present invention, a method of prolonging the shelf life of snack foods comprises storing the snack food in an argon-rich environment in a substantially gas-impermeable container.

The use of an argon-rich atmosphere in contact with the product is found both to prolong the shelf life of the product and, just as importantly, greatly reduce the deterioration in taste quality. Indeed, taste tests have consistently resulted in very high scores for snack foods stored in accordance with the present invention.

The use of an atmosphere of substantially 100% argon has been found to be particularly effective in the

prolongation of shelf life and taste quality of snack foods.

Moreover, since argon is denser than air the air formerly in the container is more efficiently displaced during packaging of the snack food, thus resulting in lower residual oxygen levels as compared with the prior art, but with the use of a similar amount of gas (or even less) to that used in the prior art.

The argon-rich atmosphere may also comprise one or more other gases including, but not limited to, other noble gases, carbon dioxide and nitrogen.

Reference to a "substantially gas impermeable" container means a container which is effective in maintaining the gas mixture within the container substantially constant during storage of the product. A typical example of such a container would be a metallised plastic film bag.

In accordance with a second aspect of the present invention, a process for packaging snack foods comprises packing the snack food in a substantially gas-impermeable container, introducing an argon-rich gas into the container and sealing the container to retain the argon-rich gas within the container.

By way of example only, a specific embodiment of the present invention will now be described with reference to the accompanying drawing which is a schematic flow diagram of a method of production of snack foods in

accordance with the present invention.

The method described is for a method of preparing potato crisps (chips) but is equally applicable to other snack foods.

At step 10 (hereinafter "step" will be replaced by "S") the potatoes are peeled and then sliced to the required thickness and at S12 they are deep fried in oil at the appropriate temperature and for the appropriate time. After being cooked the potato crisps are cooled at S14 (either in the normal atmosphere or by means of a cooling arrangement) and at S16 seasonings (such as salt and/or other flavours) are added to the cooled potato crisps.

At S18 predetermined portions (by weight) of the cooled, seasoned potato crisps are dispensed into a series of containers in the form of plastic bags 20 which are open at one end and which are conveyed sequentially along a packing or filling line.

As illustrated schematically, the bags 20 are formed in a conventional manner from a web 22 of bag material which is formed into a continuous tube by means of a web welding unit 24 which secures together the opposite longitudinal edges of the web (e.g. by means of heat or radio frequency welding) to form a continuous longitudinal seam 26. The tube is sequentially formed into individual bag units 20, after having been filled, by means of a bag sealing unit 28, which forms transverse

seals 30 which form the top of a filled bag and the base of the bag to be filled next.

As for the conventional use of nitrogen, just prior to and/or during filling of the plastic bags 20 with the portions of crisps, a so-called "lance" 32 is positioned via the open end of the bag to be filled such that its end lies within the walls of the bag to be filled. A charge of argon-rich gas (for example 100% argon) is then injected into the bag prior to and/or during and/or after the potato crisps have been dispensed into the bag. As they are filled, the bags pass sequentially into the sealing apparatus 28 which seals the open end of the bag. The filled, sealed bags are then taken away to be separated into individual bags and for further packing.

The apparatus required for this embodiment is conventional and need not be described further hereinafter since it will be well known to those skilled in the art.

As indicated previously, the atmosphere in contact with the potato crisps in the bag need not be 100% argon. For example, other gases instead of, or in addition to argon (such as other noble gases, nitrogen and carbon dioxide) may be injected via the lance 22. Moreover, the lance may be arranged to displace only a proportion of the air within the bag rather than to replace the contents entirely with the gas flowing through the lance 22.

The use of argon, which is heavier than air, helps

to displace the air from the bags during purging with the argon-rich gas, resulting in lower residual oxygen levels as compared with the prior art. Taste tests for snack foods packaged and stored in accordance with the present invention also consistently result in very high scores.

Although the specific embodiment has been described with reference to potato crisps, it will be appreciated that it is equally applicable to other snack foods as described previously and that only the preparation of the snack food will differ. The filling of the packets with the snack food will be substantially identical to that described for potato crisps.

The invention is not restricted to the details of the foregoing embodiment.

CLAIMS

1. A method of prolonging the shelf life of snack foods, comprising storing the snack food in an argon-rich environment in a substantially gas-impermeable container.
2. A method as claimed in claim 1, wherein the argon-rich environment is substantially 100% argon.
3. A method as claimed in claim 1, wherein the argon-rich atmosphere further comprises one or more other gases.
4. A method as claimed in claim 3, wherein the one or more other gases is/are selected from the group comprising other noble gases, carbon dioxide and nitrogen.
5. A method as claimed in any of the preceding claims, wherein the substantially gas-impermeable container comprises a plastic film bag.
6. A method as claimed in claim 5, wherein the plastic bag comprises a metallised plastic film bag.
7. A method of preserving potato crisps (chips) comprising a method as claimed in any of the preceding claims.
8. A process for packaging snack foods, comprising packing the snack food in a substantially gas-impermeable container, introducing an argon-rich gas into the container and sealing the container to retain the argon-rich gas within the container.
9. A process as claimed in claim 8, wherein the gas comprises substantially 100% argon.

10. A process as claimed in claim 8, wherein the argon-rich gas further comprises one or more other gases.

11. A process as claimed in claim 10, wherein the one or more other gases is/are selected from the group comprising other noble gases, carbon dioxide and nitrogen.

12. A process as claimed in any of claims 8 to 11, wherein the argon-rich gas displaces substantially all of the air previously within the container.

13. A process as claimed in any of claims 8 to 11, wherein the argon-rich gas displaces a proportion of the air formerly within the container.

14. A process as claimed in any of claims 8 to 13, wherein the substantially gas-impermeable container comprises a plastic film bag.

15. A process as claimed in claim 14, wherein the plastic bag comprises a metallised plastic film bag.

16. A method of prolonging the shelf life of snack foods, substantially as herein described, with reference to, and as illustrated in the accompanying drawing.

17. A process for packaging snack foods substantially as herein described, with reference to, and as illustrated in, the accompanying drawing.

18. A method of prolonging the shelf life of potato crisps (chips), as claimed in any of claims 1 to 7 and 16.

19. A process for packaging potato crisps (chips), as claimed in any of claims 8 to 15 and 17.



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Claims searched: 1 to 19

Examiner: Steve Wintersgill
Date of search: 5 February 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.Q): B8C (CF11, CF12, CWP3)
Int Cl (Ed.6): A23B 4/14, 4/16, 7/152; A23L 3/3445; B65B 31/00, 31/02; B65D 81/20
Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
Y	WO 93/17652 A1 (L'AIR LIQUIDE) see page 13 line 1 to page 14 line 2.	3, 4, 11, 13 and 14.
X,Y	US 3,498,798 (BAUR) see whole document.	X: 1, 2, 5 to 9 and 15 to 19. Y: 3, 4, 10 and 11.

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
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E Patent document published on or after, but with priority date earlier than, the filing date of this application.